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Comparison of Municipal Bond Markets in the USA and China

Student: Jie Li

Supervisor of the bachelor thesis:Ing. Martina Novotná,Ph.D.

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VYSOKÁ ŠKOLA BÁŇSKÁ-TECHNICKÁ UNIVERZITA OSTRAVA
Ekonomická fakulta
1

Ing. Iveta Ratmanová, Ph.D.
Head of Department

prof. Dr. Ing. Zdeněk Zmeškal
Dean

The declaration

"I hereby declare that I have elaborated the entire thesis including annexes myself."

Ostrava dated 30/04./2019

李杰, Li Jie

Student's name and surname

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1 Introduction

Municipal bonds refer to bonds issued by local governments or other qualified issuers of a country, which is a debt certificate that promises to repay principal and interest on time. The United States is the birthplace of municipal bonds, it is also the largest and most developed country in municipal bond issuance.

The main objective of this thesis is to access the recent development and current trends in the municipal bond markets in China and the USA, and compare the difference betweenthe two countries, the focus is based on types of sub-sovereign bonds issued in both countries, the amount of issuance, the main used of the issuance, maturity of sub-sovereign bonds, ratings and regulation system.

This thesis generally describes and analyzes the capital market in chapter 2, andthen it makes an introduction to the present situation of the government bonds market, which pays attention tomunicipal bonds. Then it focuses on the situation of municipal bonds in the U.S. and China in chapter 4. In addition, it focuses on “city bond”, which is fitted in China’s situation and similar to a municipal bond. At last, the thesis uses the United States for reference for the development of China. The market development experience has crucial significance for the development of China's local debt market. Finally, in this thesis, it compares China's local debt and American municipal debt and suggests that China should establish and gradually optimize the issuance, supervision, and risk prevention system of local debt as soon as possible on the basis of the mature operation and management experience of developed countries.

2 Role of Capital Market

Considering the role of the capital market in the market economy, the capital market plays an important role. Through its unique mechanism, the capital market has successfully contributed to the economic development of society. Firstly, we should know the financial market.

2.1Characteristics of Financial Market

A financial market is a broad term describing any marketplace where tradings of securities including equities, bonds, currencies, and derivatives occur (Fabozzi, 2014). The term "market" is sometimes used for what are more strictly exchanges, organizations that facilitate the trade in financial securities, e.g., a stock exchange or commodity exchange. This may be a physical location (e.g. NYSE, LSE, JSE, BSE) or an electronic system (e.g. NASDAQ).

Securities are the general name of various economic certificates of equity. Therefore, in a broad sense, the securities market refers to the place where all securities are issued and traded. In a narrow sense, the most active securities market refers to the capital market securities, money securities market and commodity securities market. It is the place where securities products such as stocks, bonds, commodity futures, stock futures, options and interest rate futures are issued and traded.

The securities market has the following three significant characteristics: First, the securities market is a place where the value is exchanged directly. Negotiable securities are the direct representatives of value, and in essence, they are only a direct form of value. Although the objects of securities trading are various securities, the securities market is essentially a place for the direct exchange of value because they are a direct form of value. Second, the securities market is the place where property rights are directly exchanged. The trading objects in the securities market are securities such as stocks, bonds and investment fund notes as economic equity certificates. They themselves are only representatives of a certain amount of property rights. Therefore, they represent the ownership or creditor's rights of a certain amount of property and the right to gain from them. The stock market is actually a direct exchange place for property rights. Third, the securities market is a place for the direct exchange of risks. Marketable securities represent both the right to a certain income and the risk. The exchange of negotiable securities transfers the right to a certain profit and at the same time transfers the risks peculiar to the negotiable securities. Therefore, from the perspective of risk analysis, the securities market is also a direct exchange place for risk (Fabozzi, 2014).

2.1.1 Classification of Financial Market

The securities market is the product of the development of the market economy to a certain stage. Securities market realizes the connection between financing and investment by issuing and trading securities, and effectively solves the contradiction between supply and demand of capital and the difficulty of capital structure adjustment. In the developed market economy, the securities market is an important part of the complete market system, which not only reflects and regulates the movement of monetary funds but also has an important impact on the operation of the whole economy.

Securities market can be classified according to the following criteria:

A. Types of securities traded,

B. Variety of securities,

C. Whether the transaction activity is carried out in a fixed place

If we consider the types of securities traded, the securities market can be divided into the bond market and the stock market.While according to the categories of securities, it is divided into the stock market, bond market, fund market, and derivative market; According to whether the transaction activity is carried out in a fixed place, it can be divided into the tangible market and intangible market. The tangible market is called "floor market", it is to point to the stock exchange market that has a fixed the place. The birth of a tangible market is one of the important signs of securities market centralization. The term "over-the-counter market" refers to a stock exchange market without a fixed place. There is no longer a distinct division between the market and the OTC market, and a multi-level structure of the securities market has emerged(Cecchetti and Kermit, 2014).

This is a structural relationship formed in the order in which securities enter the market. According to this order, the composition of the securities market can be divided into issuing market and trading market.

The competition between issuers and investors is an opportunity for the formation of a securities issuing market. In the securities issuing market, there is not only the securities flow from issuing subject to investors but also the monetary capital flow from investors to issuing subject. Therefore, the issuance market of securities is not only the market for issuers to raise funds, but also the market to provide investors with investment opportunities.

Vertical structure relationship is a structural relationship formed in the order in which securities enter the market. According to this order, the composition of the securities market can be divided into issuing market and trading market. The securities issuance market, also known as the "primary market" or "primary market", is a market formed by an issuer to sell securities to investors in accordance with certain legal provisions and issuance procedures for the purpose of raising funds. As an abstract market, securities issuance market is not limited to a fixed place. The securities issuing market reflects the market relationship of securities from issuing subject to investors. The competition between issuers and investors is an opportunity for the formation of a securities issuing market. In the securities issuing market, there is not only the securities flow from issuing subject to investors but also the monetary capital flow from investors to issuing subject. Therefore, the issuance market of securities is not only the market for issuers to raise funds, but also the market to provide investors with investment opportunities. The securities exchange market is the place where the issued securities are circulated and transferred through trading. Relative to the issuing market, the stock exchange market is also called "secondary market" or "secondary market". After the underwriting of the issuance market, securities enter the circulation market, which reflects the market relationship between investment withdrawal and investment entry between new and old investors. Therefore, the securities circulation market has two functions: one is to provide holders of securities with a place to sell securities for cash at market price when they need it; the second is to provide investment opportunities for new investors. Stock exchange market can be divided into tangible exchange market and intangible over-the-counter market. Securities issuing market and trading market are closely related, interdependent and interactive. The issuing market is the existing foundation of the trading market. The issuing condition and the issuing way of the issuing market affect the price and liquidity of the trading market. The trading market can promote the development of the issuing market and provide a place for the realization of securities issued in the issuing market. At the same time, the price and liquidity of securities in the trading market directly affect the issuing scale and conditions of new securities in the issuing market (Cecchetti and Kermit, 2014).

And another one is a horizontal structure relationship, which is the structure relation that forms according to the breed of negotiable securities. The composition of this structural relationship mainly includes the stock market, bond market, fund market, derivative securities market, and other sub-markets, and each sub-market is related to each other. The stock market is the place where stocks are issued and traded. The issuer of the stock market is a joint stock limited company. The capital raised by a joint stock company on the stock market is long-term stable capital owned by the company. The object of the stock market transaction is stock. The market price of the stock is not only related to the operating status and profitability of joint-stock companies but also influenced by other factors such as politics, society, and economy. As a result, stock prices often fluctuate. The bond market is the place where bonds are issued and traded. The issuers of bonds include the central government, local governments, government agencies, financial institutions, companies, and enterprises. The bond market trades bonds. Becausethe bond has a fixed coupon rate and maturity, the market price is relatively stable compared with the stock price. Fund market is the market of the fund security issue and current. Closed-end funds are listed and traded in stock exchanges, and open-end funds are circulated by investors' application and redemption to fund management companies. The derivative securities market is based on the existence and development of basic securities. Its trading varieties mainly include financial futures and options, convertible securities, depositary receipts, warrants and so on.

2.1.2 Participants in Financial Market

The issuer of securities, which refers to the government and its institutions, financial institutions, companies, and enterprises that issue bonds, stocks and other securities to raise funds. The issuer of securities is the main body of securities issuance. Securities issuance is the act of selling securities to investors. Negotiable securities issue can deal with directly by the issuer, issue of this kind of negotiable securities calls oneself do issue or issue directly. Self - run issue is a special issue, and it is rare. Since the end of the 20th century, due to the application of network technology in distribution, self-managed distribution began to increase. Securities issuance is generally entrusted by securities issuers to securities companies, also known as underwriting, or indirect issuance. According to the risk of issuance, the allocation of funds raised and the level of fees and other factors, the underwriting method has two kinds of underwriting and consignment, underwriting can be divided into full underwriting and balance underwriting.

Securities investors are the fund providers of securities market and buyers of financial instruments. There are many types of securities investors, and the purpose of the investment is different. Securities investors can be divided into institutional investors and individual investors in two categories. Institutional investors refer to investors who have capital, information and human resources advantages over small and medium-sized investors and can influence the fluctuation of a certain security price, including enterprises, commercial Banks and non-bank financial institutions (e.g. pension funds, insurance funds,securities investment funds). Although the capital source, investment purpose and investment direction of all kinds of institutional investors are different, they are generally characterized by large amount of investment capital, strong ability to collect and analyze information, focus on the safety of investment, diversification of investment risk through effective asset portfolio, and great impact on the market. Individual investors refer to the residents engaged in securities investment, who are the broadest investors in the securities market. The main investment purpose of individual investors is to pursue profit and capital preservation and appreciation, so they attach great importance to the safety of principal and the liquidity of assets.

Securities market intermediary institutions refer to all kinds of institutions providing services for the issuance and trading of securities, including securities companies and other securities service institutions, which are generally referred to as securities intermediary institutions. Intermediary institutions are the bridge between securities investors and fundraisers. The function of securities market depends on the activities of securities intermediaries to a great extent(Cecchetti and Kermit, 2014). Through their operation and service activities, they communicate the relationship between securities demander and securities supplier, not only ensure the issuance and transaction of various securities but also play a role in maintaining the order of the securities market.A securities company refers to a financial institution with the legal person status that can operate securities business according to law. The main business of a securities company is underwriting, brokerage, self-management, investment consulting, merger and acquisition, entrusted asset management, fund management, etc. Securities companies are generally divided into comprehensive securities companies and brokerage securities companies. Securities service institutions refer to legal person institutions established according to law to engage in the securities service business, mainly including financial advisory institutions, securities investment consulting companies, accounting firms, asset appraisal agencies, law firms, securities credit rating agencies, etc.

Self-regulatory organizations include stock exchanges and stock trade associations. According to the securities law of the People's Republic of China, a stock exchange is a non-profit-making legal person that provides a place for centralized securities bidding and trading. Its main responsibilities are: to provide trading venues and facilities; Formulate trading rules; Supervise the compliance and legality of the securities listed on the exchange and the trading behaviors of its members, and ensure the openness, fairness, and impartiality of the midfield.The securities industry association is a self-regulatory organization of the securities industry and a legal person of a social organization. The authority of the securities industry association is a general meeting of all its members. According to the securities law of the People's Republic of China, securities companies should join the securities association. The securities industry association shall perform assist securities regulatory organization members to implement the relevant laws, safeguard the legitimate rights and interests of members, provide information service for members, set the rules, organize training and conduct business communication, and mediation, as far as the development of the securities industry research, to supervise and inspect the member behavior, as well as other duties given by the securities supervision and administration institution. Securities registration and settlement organizations are legal persons that provide centralized registration, depository and settlement services for securities transactions and are not profit-oriented. In accordance with the measures for the administration of securities registration and settlement, securities registration and settlement institutions shall exercise self-discipline in the industry.

2.2 Importance of Capital Market

Capital market, which is known as long-term capital market, is an important part of the financial market. As a theoretical concept corresponding to the money market, the capital market usually refers to the market composed of various financing activities with a term of more than one year. Because in long-term financial activities, capital has a long term, high risk and relatively stable income, which is similar to capital input, it is called the capital market.

Considering the role of the capital market in the market economy, the capital market plays an important role. Through its unique mechanism, the capital market has successfully contributed to the economic development of society. Public authorities must, therefore, take note of the importance of capital markets in the national economy and, on the other hand, work to ensure the necessary framework for the functioning of their specific mechanisms. The value of capital may be more interesting in the case of emerging markets, which have contributed to redirecting financial resources to efficient activities, to economic reform and to the process of privatization.

Essentially, capital is wealth, usually in the form of money or physical property. There are two main types of people in capital markets: those who seek capital, and the others are those who provide it. The people who look for capital are usually businesses and governments. Capital is provided by people who want to make money by lending or buying assets.

Compared with the money market, there are several main characteristics of the capital market.At least a year or more, it can be decades or even years with no due date. For example, the term of medium - and long-term bonds are more than 1 year; A stock that has no maturity date belongs to a stock that has no maturity date and belongs to permanent security; Closed-end funds generally have a maturity of 15-30 years.The funds raised in the capital market are mostly used to solve the medium - and long-term financing needs, so the liquidity and liquidity are relatively weak.Due to the long term of financing, the possibility of major changes is also large, market prices are easy to fluctuate, investors need to bear greater risks. At the same time, as a reward for risk, its return is also higher.In the capital market, capital suppliers are mainly savings Banks, insurance companies, trust and investment companies, various funds and individual investors. The capital demand side is mainly enterprises, social groups, government agencies and so on. It is the trading object is medium - and long-term credit instruments, such as stocks, bonds and so on. The capital market mainly includes medium - and long-term credit market and securities market, also the amount of borrowing capital is much larger and the change of the price is bigger.

The participants of the capital market are mainly those who have a surplus of funds and those who have a deficit of funds. The persons having surplus money want to invest in the capital market in the hope of getting high returns on their investment. On the other hand, people with fund deficit try to get financing from the capital market by selling stocks and bonds. These two kinds of activities keep the capital market going.

The investors obtain the right of getting capital which is signed on the contract in the future by investing in its capital in a recipient investor. The parties also agree on interest payment to the investors. General interest is paid annually. The interest rate is mainly determined by the playability of the recipient and the interest rate in the capital market. In the capital market, the recipient is the demand for capital and the provider of the right to pay in the future. Market activities in the capital market include buying and selling stocks and bonds, raising the capital of a company limited by shares, and lending by natural persons.

The capital suppliers of the capital market are various financial institutions, such as Commercial Banks, Savings Banks, life insurance companies, investment companies, trust companies, etc (Fabozzi, 2014).

The capital is mainly needed by international financial institutions, national government agencies, industrial and commercial enterprises, real estate operators and sales finance companies that buy installment contracts from durable consumer retailers.

2.3 Functions of Capital Market

The capital market has the financing and investment function. The financing and investment function of the capital market means that the capital market, on the one hand, provides the demander with the opportunity to raise funds through issuing securities, and on the other hand, provides the provider with the investment objects. Any security traded in the capital market is both a vehicle for raising capital and an instrument for investment. In the process of economic operation, there are both surplus and shortage of funds. In order to increase the value of capital, the surplus investor must look for investment objects. In order to develop their own businesses, those who are short of funds have to seek funds from the society. In order to raise funds, those who are short of funds can raise funds by issuing various securities, while those who are surplus can invest by buying securities. Financing and investment are two inseparable aspects of the basic functions of the capital market.

The second fundamental function of capital markets is to set prices for capital. Securities are the manifestation of capital, so the price of securities is actually the price of capital represented by securities. The price of securities is the result of the joint action of supply and demand of securities in the securities market. The operation of the securities market has formed a competitive relationship between the demand for securities and the supply of securities. As a result of this competition, the demand for capital with a high return on investment is great, and the corresponding price of securities is high. Conversely, the price of the security is low. Therefore, the securities market provides a reasonable pricing mechanism for capital.

The capital allocation function of the capital market refers to the function of realizing reasonable capital allocation by guiding the capital flow through the security price. Due to the existence of strong evaluation, selection and supervision mechanism in the capital market, the investment subject, as a rational economic person, always has a clear profit motive, so as to promote the flow of funds to the high-efficiency sector, showing the function of optimal allocation of resources.

The property right function of capital market refers to the property right constraint of the market subject and the function of acting as the intermediary of property right transaction. The property right function is the derivative function of the capital market, which plays an important role in the process of the enterprise property right reorganization through the transformation of the enterprise operation mechanism, the provision of capital financing for enterprises, the transmission of property right transaction information and the provision of property right intermediary services.

2.4 The Relationship betweenEconomy and CapitalMarket

Economic growth in a modern economy depends on an effective and efficient financial sector that concentrates domestic savings and mobilizes funds for productive projects. Without effective capital markets, most productive projects with a development agenda may not be developed and utilized. The capital market connects the monetary sector with the real sector, thus promoting the growth of the real sector and economic development.

In the form of money, the capital market realizes the transfer of current purchasing power between enterprises with excess capital and those with insufficient capital in exchange for the enhancement of future purchasing power. In this way, it is possible for capital markets to distinguish between saving and investment.

Capital markets increase the proportion of long-term savings going to long-term investments. Capital markets enable the contract savings industry to mobilize long-term savings from small individual households and invest them in long-term investments. It realizes the transfer of current purchasing power from surplus sector to deficit sector in the monetary form in exchange for the repayment of greater purchasing power in the future. In this way, capital markets enable companies to raise capital/capital to fund their investments in physical assets. Which means that the improvement of productivity within the economy will lead to more employment and the increase of total consumption, thus promoting growth and development. It also helps relieve stress in the banking system by matching long-term investment with long-term capital. It encourages small savers to own productive assets more broadly. It enabled these countries to benefit from economic growth and the distribution of wealth and provided a way to encourage investment opportunities in a culture of thrift that was essential to raising domestic savings and investment rates essential for rapid industrialization(Fabozzi, 2014).

Capital markets also provide equity capital and infrastructure development capital, which have strong socio-economic benefits through the development of roads, water supply, and drainage systems, housing, energy, telecommunications, and public transport. These projects are ideal for funding through capital markets through long-term bonds and asset-backed securities. Infrastructure construction is a necessary condition for long-term sustainable development. In addition, capital markets increase the efficiency of capital allocation by ensuring that only projects deemed profitable and therefore successful attract capital. Given the current momentum of global integration, this, in turn, will enhance the competitiveness of domestic industries and their ability to compete globally. The result will be an increase in domestic productivity, which may affect export growth and thus economic growth and development.

The role of capital markets in the distribution of wealth is critical to inclusive growth and makes capital safer for investors. Capital markets can create greater financial inclusion by introducing new products and services tailored to investors' appetite for risk and reward and borrowers' project needs and risk preferences. Innovation, credit counseling, financial education, and appropriate market segmentation are possible strategies to achieve this goal.

In addition, capital markets promote public-private partnerships to encourage the private sector to participate in productive investment. As resources continue to decline, economic development must be shifted from the public to the private sector in order to increase economic productivity. It assists the public sector in narrowing resource gaps and complements its efforts to finance basic socio-economic development by raising funds for long-term projects. It has also attracted foreign portfolio investors who are crucial in replenishing domestic savings levels. It helps foreign financial resources flow into the domestic economy.

3 Fundamentals of Sovereign and Sub-Sovereign Bonds

In the previous chapter we described the principals of the capital market, in this chapter, we pay more attention to the sovereign and sub-sovereign bonds, and then we focus on municipal bonds. Sovereign bonds are debt securities issued by a national government. And sub-sovereign bonds (municipal bonds) are issued by a local government or public institution in a country with revenue.

According to the ***Cambridge Dictionary***, the word "sovereign" is used to describe money that is borrowed or invested by national governments, which has almost the same meaning of "government". Thus, we use the term government bonds in the following context.

3.1 Main Characteristics of Sovereignand Sub-Sovereign Bonds

There are government bonds and municipal bonds in the financial markets as we mentioned at the beginning of this chapter. Now we explain these two types in details.

3.1.1 Principals of Sovereign Bonds

Sovereign bonds known as government bondsare debt certificates issued by the government to the investors for raising funds and promising to pay interest and repay the principal in a certain period. The two are sometimes referred to collectively as public debt, including state bonds, namely central government bonds, local government bonds, and government guaranteed bonds.

The principal of government bonds is mainly examined from two aspects:

First, from the formal point of view, government bonds are also a kind of negotiable securities, which have the general nature of bonds. Government bonds have their own denominations.

Investors can earn interest by investing in government bonds. Therefore, government bonds have the general characteristics of bonds.

Second, from a functional point of view, government bonds initially is only part of the government deficit means, but under the condition of modern commodity economy, government bonds have become an important means of government to raise funds, to expand public spending, and with the development of financial market, gradually, which has the function of the financial goods and credit tools, become a national implementation of the tool of macroeconomic policy, the macroeconomic regulation and control (Bodie, 2011).

Basically, the sovereign bonds include Treasury and public debt. General Treasury bonds are issued by the ministry of finance to make up for the financial imbalance. Public debt is a kind of bond issued to raise funds for public construction. The two are sometimes referred to collectively as public debt. Those issued by the central government are called central sovereign bonds and those issued by local governments are called local sovereign bonds. Any of various bonds issued by the federal government of the United States, including treasuries, Treasury notes, and federal government bonds.

Government bonds have the following characteristics:

A. High security. A government bond is a bond issued by the government, which bears the responsibility of servicing principal and interest. Government bonds, often called gilts, have the highest credit rating of any kind. Investors buying government bonds are a safer bet according to the factors of economic strength, institutional strength, fiscal strength, and event risk.

B. High liquidity. Government bonds are government bonds, its circulation is generally very large, at the same time, as a result of the government bond credit is good, strong competitiveness, market property is good, so, many countries government bonds in the secondary market is very developed, generally not only allows listed on the stock exchange transactions, also allows in trade in the OTC market. The developed secondary market has facilitated the transfer of government bonds and greatly enhanced its liquidity.

C. Stable income. Investors can earn a certain amount of interest on government bonds. The interest payment of government bonds is guaranteed by the government, which has the highest credit rating and the lowest risk. For investors, the return on investment in government bonds is relatively stable. In addition, since most of the principal and interest of government bonds are fixed and guaranteed, the transaction price will not fluctuate greatly, and in the secondary market can obtain relatively stable income (Fabozzi, 2012).

D. Tax-free treatment. Government bonds are the government's own bonds. In order to encourage people to invest in government bonds, most countries stipulate that the proceeds from the purchase of government bonds can be treated tax-free. According to the individual income tax law of the People's Republic of China, the income from interest, dividends, and bonuses on corporate bonds invested by individuals shall be included in the individual income tax, but the interest income from national bonds and financial bonds issued by the state may be exempted from the individual income tax. Therefore, when the nominal yield of government securities is equal to that of other securities if the tax is taken into account, investors holding government bonds can obtain more actual investment gains.

E. Sovereign bond yields are the interest rates governments pay on their debt. Like corporate bonds, their yields depend on the risk the buyer takes. Unlike corporate bonds, these include exchange rates, economic uncertainty and political risk that could lead to a default on interest or principal.

Here are the three main determinants of sovereign bond yields:

A. Creditworthiness. Creditworthiness is a country's ability to pay its debts in the current situation. Investors often rely on rating agencies to help determine a country's credit rating based on growth rates and other factors.

B. National risk. Sovereign risk is an external factor that can create and harm a country's solvency. In some cases, for example, turbulent politics could play a role in raising the risk of default if an irresponsible leader comes to power.

C. Exchange rates. Exchange rates have a significant impact on sovereign bonds denominated in local currencies. Some countries inflate their way out of debt by simply printing more money and devaluing it.

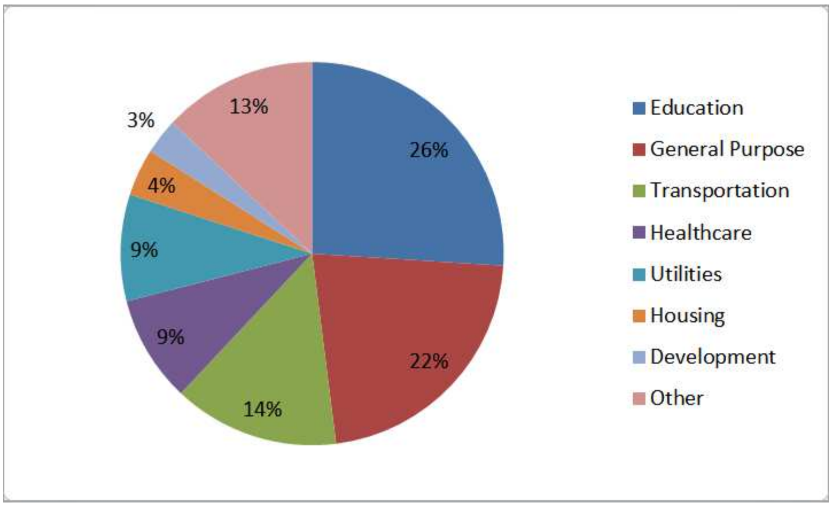
3.1.2 Characteristics ofSub-Sovereign Bonds

Sub-sovereign bonds are known as municipal bonds.Since the principal part of this thesis is focused on the municipal bonds in China, the following chapters describe municipal bonds, their role, and characteristics in more details.

Issuers of municipal bonds include state and local governments, state regulators, local authorities, and public universities. There are over 31,000 different municipal bond issuers with bonds outstanding in the United States.In 2017, $448.0 billion in long-term municipal securities were issued, 15.1% above the $389.3 billion in 2008. The municipal bond market outstanding was $3.9 trillion as of end-2017, up 5.5% from end-2008(SIFMA, 2018a)

For the use of insurance of municipal bonds, most of them are used on education, general purpose, transportation, health care, and some other. For example, in the United States, almost half of the insurance of municipal bonds are on education and general purpose in 2017 (see Figure 1).

Figure 1: Municipal bonds Issuance in 2017（USA）



Source: Thomson Reuters 2017, author

State or local bond authorities are established for specific purposes. Sometimes the government entrusts a commercial bank to issue the bonds, sometimes the government asks the mortgage bank to issue the bonds with the property and financial revenue within the scope of the government as the guarantee. The mortgage bank takes the creditor's rights of the municipal government as the collateral and the public issues the municipal bonds. The bonds are mainly used to raise funds for municipal construction. The main buyers of municipal bonds are banks, insurance companies, however, since interest income from municipal bonds is generally exempt from income tax, more and more individuals are buying them.

While many municipal bonds offer income exemptions from federal and state taxes, not all municipal bonds have these tax characteristics. There is a fully independent market for municipal bonds that are taxed at the federal level, as part of the alternative minimum tax, but still, offer a state or local tax break on interest paid by residents of the issuing state. In addition, there are other types of municipal securities that are taxed at the federal, state, and local levels. Since many municipal bonds are issued by designated financing units, there is also a considerable risk of default or deferred payment. In addition, many municipal bonds are relatively illiquid.

3.2 Role of Municipal Bonds

Municipal bonds have the following main functions:

Municipal bonds promote urban development and economic development. The funds raised by the issuance of municipal bonds are generally used to finance public services that private capital is unwilling or unable to provide, such as the construction of roads, ports, schools, hospitals and other infrastructure and public facilities. On the one hand, it is conducive to the improvement of the urban environment, so as to create conditions for better economic development. On the other hand, it is also conducive to the concentration of private capital in the development of competitive and profitable industries, so as to improve the investment efficiency and enhance the economic strength of the city (Fabozzi, 2012).

Municipal bonds balance local government revenue and expenditures. From the perspective of international experience, municipal bonds issuance is one of the main means for local governments to balance their fiscal revenues and expenditures and make up for fiscal deficits. By issuing municipal bonds to obtain the funds needed for fiscal expenditure or to cover the fiscal deficit, not only can the required funds be obtained relatively quickly, but also, different from raising the tax rate, will not increase the social tax burden. If we can realize the virtuous circle of "debt for construction, urban environment improvement, better economic development, increased tax revenue, and repayment of existing debts", it will be more ideal.

Municipal bonds coordinate with the implementation of local economic regulation and control. By controlling the issuance of municipal bonds, the demand for public investment can be influenced, so as to adjust the economic aggregate. Municipal bonds can temporarily transfer the ideal funds of individuals and enterprises to local governments so that savings can be converted into an investment, and thus stimulate employment and increase consumption. Municipal bonds also allow individuals to transfer funds originally used for consumer spending to local governments for investment, thus achieving economic restructuring. Therefore, by issuing municipal bonds, local governments can regulate the relationship among regional economic investment, savings, consumption, employment, and other aspects, so as to realize the purpose of regulating the local economy.

Municipal bonds can meet social investment needs better. Municipal bonds with low risks and safe and reliable yields are suitable for investors from financial institutions and social organizations to individuals and enterprises. The emergence of municipal bonds can enrich bond market varieties, improve bond market structure, add new investment means for the society and better meet the investment needs of the society.

3.3 Main Participants in the Municipal Bonds Market

Municipal bonds have been in the United States for more than two hundred years, so we describe the participants of municipal bonds in the United States.

A. Municipal bonds issuers. Government agencies are the main role of the finance team. Due to the relative independence of U.S. state laws and tax systems, the issuance process and restrictions of municipal bonds vary from state to state. In order to meet the requirements of tax exemption, the fundraising usually needs to be fully invested in related projects within 3-5 years.

B. Municipal Advisor. Entrusted to supervise and manage the assets and financial and financial affairs of municipal bond issuance in accordance with the requirements of investor protection. What an interesting thing is that, at the legal level, municipal bond consultants do not act as independent third parties like auditors, but make suggestions on the structure, sales, and promotion of bonds on behalf of the interests of bond issuers, and assume the responsibility of liaison and coordination among all relevant parties.

C. Bond Counsel. Serves as the issuer's legal Counsel, reviewing project details (such as whether insurance premiums are tax-deductible under federal and state law), ensuring that the issue is legal and compliant, and writing core documents such as loan contracts.

D. Underwriter. A syndicate/selling group broker-dealer agreed upon by municipal bond advisers and bond counsel, responsible for the issuance and sale of bonds.

E. Broker. An intermediary between an underwriter and an investor.

F. Municipal bondholders, which are the investors. With the development of science and technology, the emergence of modern trading platforms such as small municipal bonds has brought opportunities to middle-income individual investors and further activated the market (Mishkin, 2016).

3.4 Types of Municipal Bonds

There are many different types of municipal bonds in different ways. For example, we can classify municipal bonds by the following criteria:

Municipal bonds can be divided into short, immediate, and long term according to the maturities. The maturities of short term are normally 1-6 years, for the immediate term, which should be 6-19 years. And for the long term, which are always more than 20 years. People who issue short-term bills raise money for a variety of reasons. Payment of irregular cash flow.To meet unexpected deficits. Or raise immediate funds for projects until long-term financing can be arranged. Bonds are usually issued to finance or refinance long-term capital projects.

Municipal bonds are classified by the source of the backing of the bond. Most bonds have a single source for backing the bond, but double-barreled bonds have 2 sources of backing. Although the interest and principal are generally paid from a primary source, double-barreled bonds are also backed by the municipality's general taxing power, so they are rated and treated as general obligation bonds. However, double-barreled bonds are rare nowadays (Cecchetti and Kermit, 2014).

The most common criteria are classified into general obligation bonds and revenue bonds:

a. **General obligation bonds** (GO) are issued by states, cities or counties and not secured by any assets. Instead, the general obligation is backed by the “full faith and credit” of the issuer, which has the power to tax residents to pay bondholders.In addition to being backed by their issuer's ability to tax, General Obligation Bonds are often cited as being the safest type of municipal bond for other reasons as well. Unlike companies which go out of business all the time, municipalities have a stronger incentive to preserve their credit, because they can't really just go out of business. They need to come back to the bond market for an unlimited amount of time into the future, in order to fund new projects for their residents. Secondly, state Law often sets the conditions under which a municipality can issue GO bonds and the type of security they can use

b. **Revenue bonds** are not backed by the government's taxing power but by revenues from a specific project or source, such as highway tolls or lease fees. Some revenue bonds are "non-recourse", meaning that if the revenue stream dries up, the bondholders do not have a claim on the underlying revenue source. Projects could include hospitals, airports, toll roads, housing projects, convention centers, bridges, and similar endeavors (O'hara, 2012). Revenue bonds are generally of higher risk than general obligation bonds, and as a result, they typically offer higher yields (see Table 2).

Table 2: General Obligation Bonds and Revenue Bonds

Type	**Source of Information**	**Using of Issuance**	**Issuer**	**Issue Terms**	**Credit Standing**
General Obligation Bonds	Fiscal Levy	Pure public goods	Local government	More strictly,need to vote	Higher
Revenue Bonds	Project income or other income	Quasi public goods	Government agency or authorized agency	Looser	High

Source: Author

4 Comparison of Municipal Bond Markets in the USA and China

The United States is the origin of municipal bonds, which is also the largest and the most developed country that the municipal bonds are issued in the world. In 1812, the New York state government issued the first municipal bond to raise money for the Erie Canal. Since the efficiency of this financing method is significantly better than that reinvesting after fiscal accumulation, the other governments in the U.S. began to follow that, which raise funds for local economic development and infrastructure construction by issuing bonds.

After two hundred years of development, municipal bonds are now the main financing channel for states and local governments in the United States. So the United States has developed a complete system of issuance, marketing, rating, insurance, and exchange market on municipal bonds. Learning from the experience of the U.S.municipal bond market is of great significance to the development of China's local bond market.

4.1 Municipal Bond Market in the USA

Nowadays, the U.S.bond market has become the most important capital market that has a variety of bonds, which can gather global capitals in the world. This market is also one of the most important financing places for the U.S. government and enterprises. The municipal bond market is an important channel of the government's financing, which is a crucial part of the U.S. bond market.

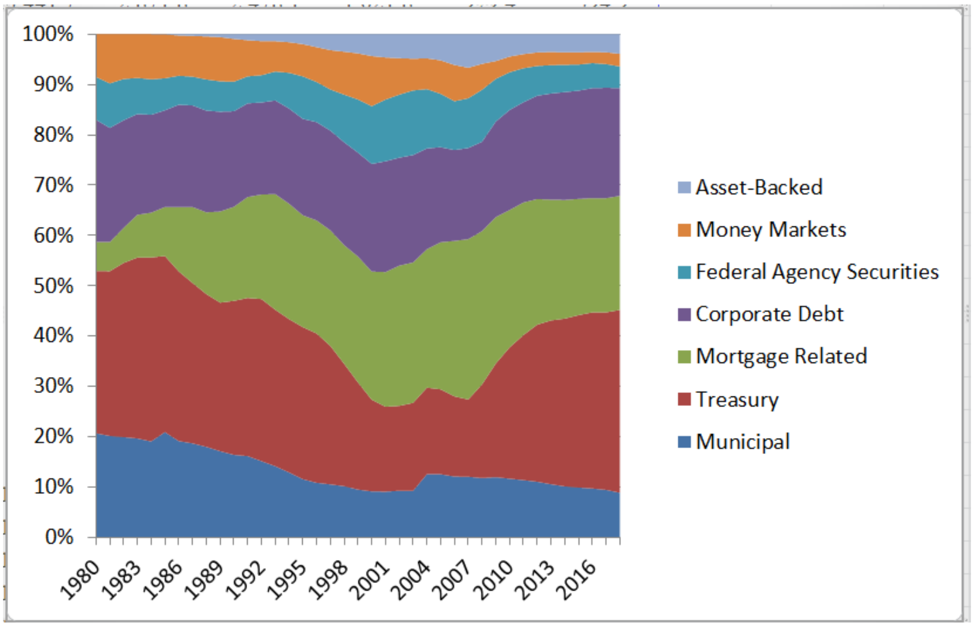
4.1.1 Current Situation of Municipal Bond Market

A. Outstanding U.S. Bond Market

From the view of relative scale, US municipal bonds accounted for 20% of the total volume in the bond market in the 1980s, and then it goes down year after year. In the past decade, the volume of municipal bonds has been stable at about 10% (see Figure 3). In terms of bond size, municipal bonds increased from \$0.4 trillion in 1980 to \$3.82 trillion in 2018, an increase of 8.55 times in 37 years (SIFMA, 2019a).

Figure 3: Proportion of Each Type in the U.S. Bond Markets

(U.S. Billions)



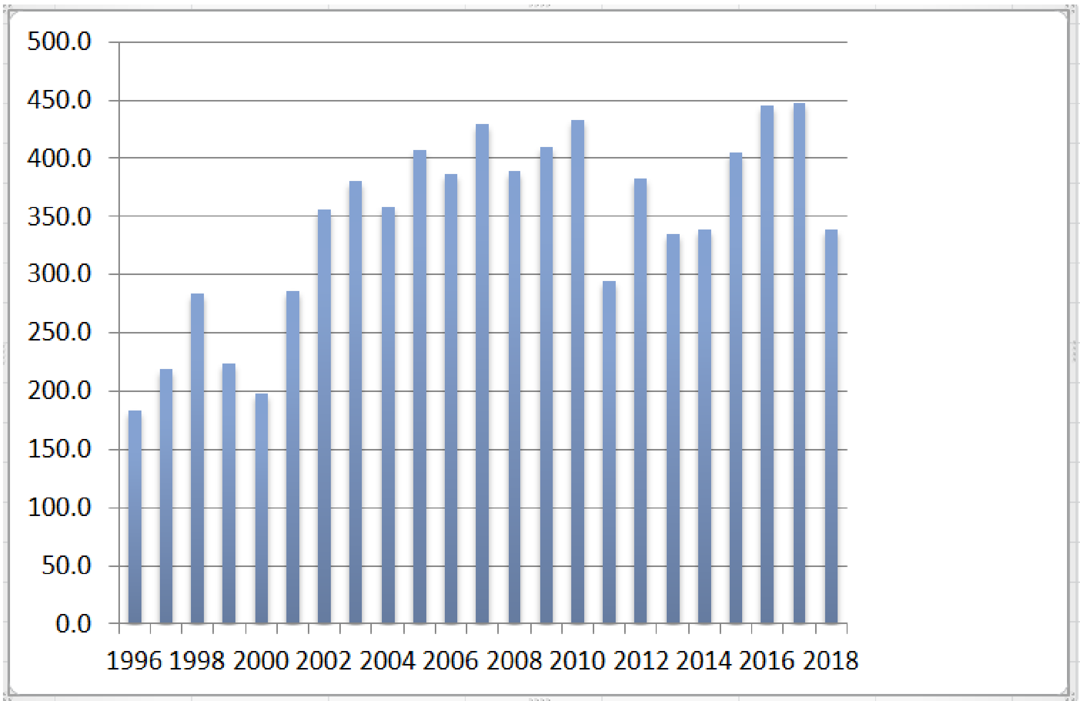
Source: SIFMA 2019, author

B. Issuance in the U.S. Bond Market

In 2018, the U.S.issued \$7424.0 billion of bonds, including \$338.3 billion of municipal bonds (see Figure 4). Before the 2008 financial crisis, the proportion of the U.S. municipal bond issuance was always stable at about 8%. However, due to some local governments (such as Detroit) had a Bankruptcy in the financial crisis, government credit rating downgrade, and other factors, which had a negative effect on the issuance of municipal bonds. As a result, municipal bond issuance now accounts for a fraction of all bond issuanceon only 4.6% (SIFMA, 2019b).

Figure 4: The U.S. Municipal Bond Issuance

(U.S. Billion)



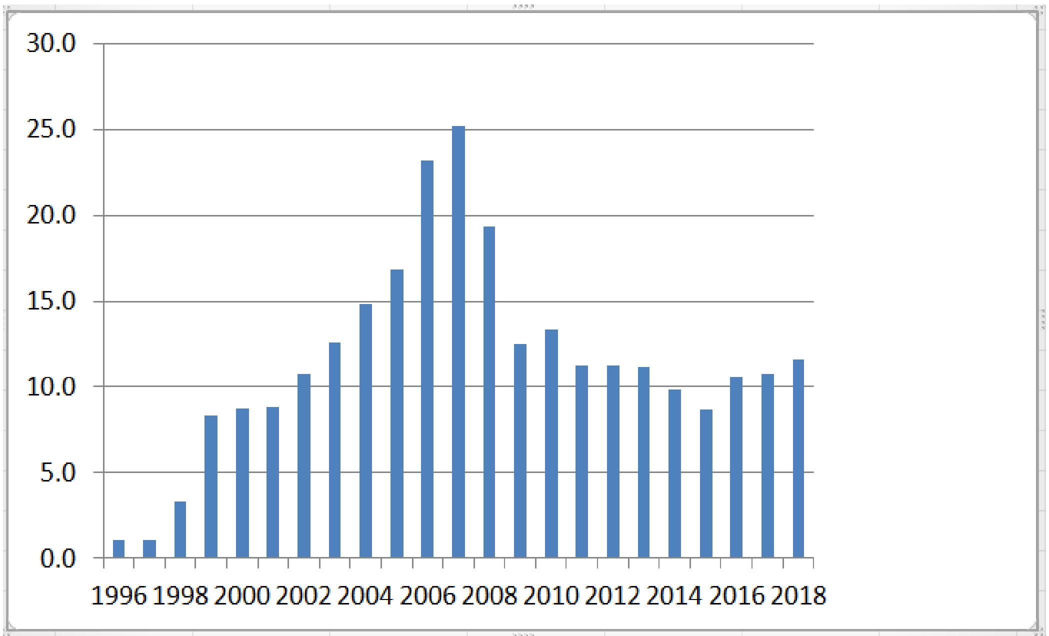
Source: SIFMA 2019, author

C. Trading Volume

U.S. municipal bonds are mostly traded on the over-the-counter market (OTC) through dealers. A smaller part of municipal bonds is traded by regional brokerages, local banks, and investment firms, while most municipal bonds are backed by large brokerages and banks. Since most buyers of municipal bonds choose to hold them to maturity, the secondary market of U.S. municipal bonds is not so active. The average daily trading volume of U.S. municipal bonds during the financial crisis in 2007 peaked at $25.1 billion and then fell back to normal. In 2018, for example, the average daily trading volume of U.S. municipal bonds traded was $11.6 billion (see Figure 5).

Figure 5:U.S. Bond Markets Average Daily Trading Volume

(USD Billions)



Source: SIFMA 2019, author

4.1.2 Structure of Municipal Bond Market

A. Issuers

There are two types of municipal bond issuers in the United States. The first group is states, towns and town governments. The second category is branches of political entities, including housing centers, public health, airports, and ports, etc. The U.S. municipal bonds are mainly used to support local economic development and raise funds for infrastructure construction (More details about sectors are shown in Annex 2). Since the United States is a country with federal states, Municipal bonds issued by local governments have independent autonomy and do not require the approval of the federal government. In New York City, for example, municipal bonds are issued not only by the New York City but also its subordinate municipal units and companies also have the right to issue bonds. The New York City water authority, for example, issued bonds to finance water projects, and the government set up the Hudson plaza development corporation to finance infrastructure.

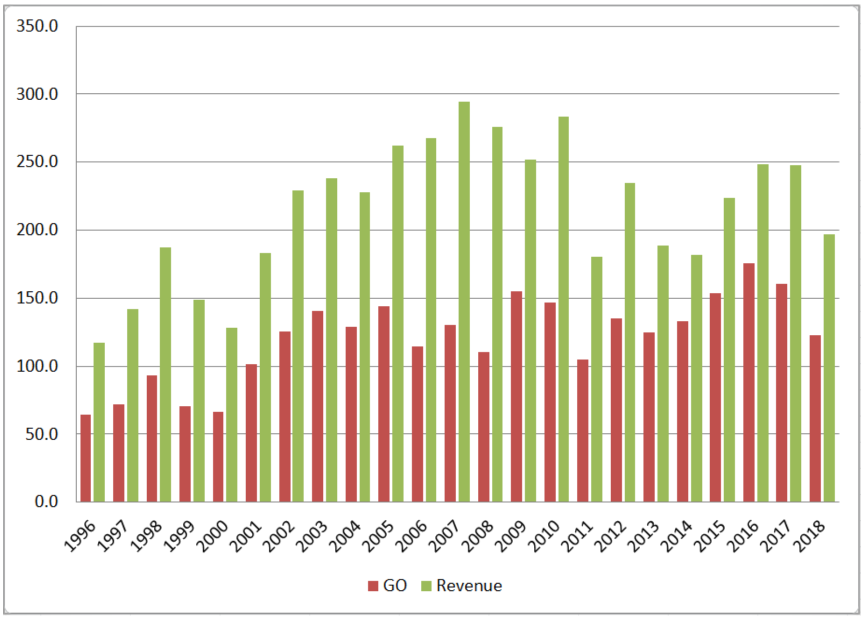
B. Types of U.S. Municipal Bonds

General obligation bonds and revenue bonds are the main municipal bonds in the United States, which account for more than 95% of us municipal bond issuance.

Revenue bonds are generally linked to specific projects or part of the tax, to the project after the completion of the income as a guarantee. For example, airport Bonds, college and university bonds, hospital bonds, toll road and gas tax bonds, and water bonds. Since the risk of project construction is relatively low, the credit rating of the revenue bond is high. However, Due to the source of reimbursement fund is too onefold, the risk still is higher than the general obligation bond.

From the perspective of issuance, the general obligation bonds dominated in the early development of municipal bonds, but later they were gradually replaced by the revenue bonds. Compared with the general liability bonds, the issuance of revenue bonds has fewer restrictions and better reflects the principle of "who uses and who pays". In recent years, the issuance of the revenue bonds has been about 1.5 times that of the general obligation bonds (see Figure 6).

Figure 6: Comparison of Issuance on U.S. General Obligation Bond and Revenue Bond Issuance (U.S. Billion)



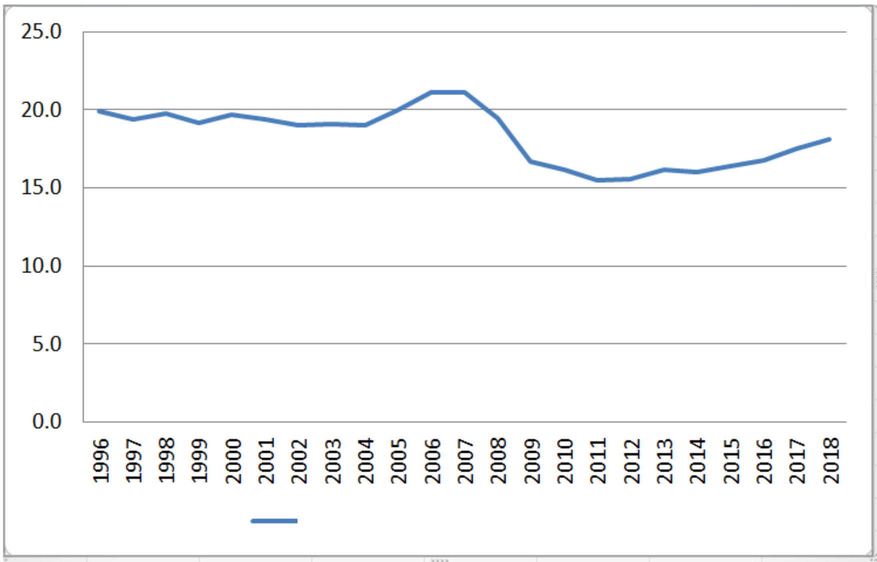
Source: SIFMA 2019, author

C. Maturity Structure

The United States has both short-term bonds with maturities of less than one year and long-term bonds with maturities of o1 to 30 years. In the U.S. municipal bonds, short-term bonds are mostly due within one year, while the issuance term of medium and long-term bonds is more than 15 years and less than 20 years. According to *SIFMA 2018*, the average final maturity at municipal bond issuance in the U.S. in 2016 was 16.9 years (see Figure 7). There is something that we should notice is that the constitution of each state in the United States sets a limit on the issuance maturity of general obligation bonds, while for project revenue bonds, the issuance maturity cannot exceed the "reasonable service life" of the project. What's more, the coupon on U.S. municipal bonds is essentially exempt from federal income tax. However, all types of municipal bonds are subject to capital gains tax (non-interest income earned on bond exchanges).

Figure 7: Average Final Maturity at Issuance of U.S. Municipal Bonds

(Year)

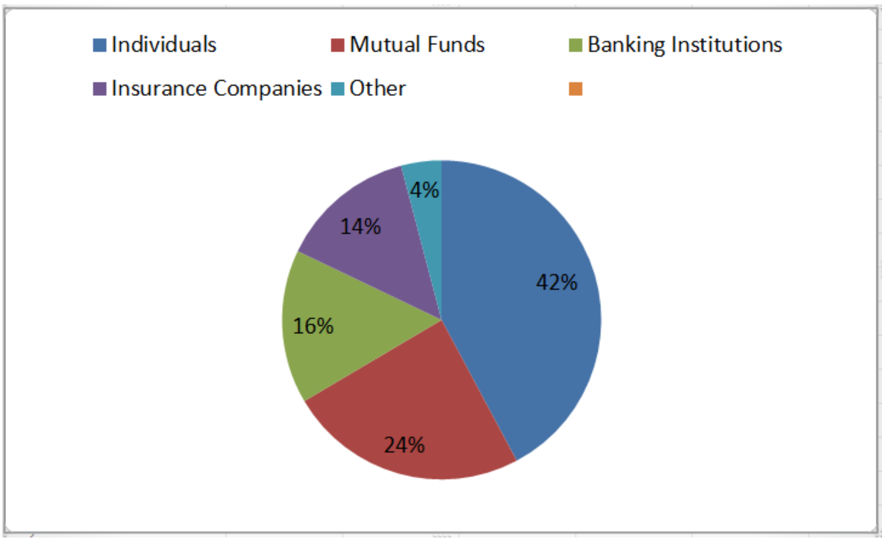


Source: SIFMA 2019, author

D. **Holders of U.S. Municipal Bonds**

Through tax incentives, local governments encourage individuals to hold municipal bonds issued by local governments. Therefore, the holders of municipal bonds in the United States are mainly individual investors. At the end of 2017, U.S. individuals held $1635.5 billion in municipal bonds, accounting for 42.2% of the total U.S. municipal bond market. In addition, mutual funds, banking institutions, and insurance companies held 24.3%, 15.6% and 13.8% of municipal bonds respectively (see Figure 8).

Figure 8: Proportion of Holders on U.S. Municipal Bonds



Source: SIFMA 2019, author

4.2 Municipal Bond Market in China

The municipal bond market in China is quite different from the United States, which is more complicated. From 1994 to 2009, the government does not allow the local governments to issue bonds directly. So the city bonds are issued in the bond market, which is called the "Chinese version municipal bond". From the perspective of the issuer, use of funds, and source of debt repayment, the city bonds have the same characters with municipal bonds and have an obvious government behavior character.

In 2009, the state council, through special approval, for the first time proposed to issue 200 billion yuan of local government bonds in the government work report, with a view to partially relieving the supporting fund pressure of local governments in the 4 trillion yuan investment plan, officially opening the door for local government bonds in China. From then on, the local government gradually issue bonds.

4.2.1 City Bonds

The budget law of the People's Republic of China (order of the President of the People's Republic of China [1994] no. 21) NO.28 states that "local governments shall not issue local government bonds unless otherwise stipulated by law and the state council." (Details in the law are shown in Annex 1). As a result, local governments can only issue bonds indirectly, which means that there are no exactly municipal bonds in China, but only nominal municipal bonds, which is called the city bonds. However, city bonds are different from corporate bonds. Their issuers mainly assume the relevant functions of local governments and enjoy corresponding preferential policies, and rarely operate independently and assume the responsibility for profits and losses based on the principle of "profit maximization".

4.2.1.1 Characteristics of the City Bonds

From the perspective of international experience, whether a bond is a municipal bond can be defined from the following four aspects: one is whether the issuer is a local government or its authorized agencies or agencies; the other is whether the funds raised are invested in the construction of urban public facilities; the third is the source of debt repayment funds; the fourth is whether it has special tax-free treatment (Zhou, 2010).In addition to the absence of special tax-free treatment, the city bond basically has the above characteristics of municipal bonds.

A. Issuers

The issuer of city bonds (city investment corporation) is a financing platform set up by local governments or departments to raise funds for municipal construction. Its business mainly concentrated in urban infrastructure construction, power investment, seaport and service industry, construction and engineering, and holding industry in multiple fields. The character of city investment companies is quite different from that of normal enterprises, and their profitability is generally poor. Financial subsidies are the main source of profits for such city investment companies. In addition, city investment companies often lack corresponding operational autonomy, and their relevant business plans, personnel arrangements, and development plans are often under the control of local governments. In essence, city investment corporation can be regarded as the agency issuing municipal bonds of local governments. Therefore, urban investment corporation meets the requirements of municipal bonds in terms of issuing subjects.

B. Use of funds

At the very beginning of its establishment, the city investment corporation had a clear positioning and the range of funds obtained from its bonds was relatively clear. It was limited to those infrastructure industries related to the government's public functions, such as water conservancy and environmental management, road construction and urban park construction, and rarely used in projects with high profitability. From the 133 issues of city bonds with statistical until December 31, 2009, investment in water conservancy and environmental governance took the first place, with 51 issues issued, accounting for 38.3%. The issuance amount was 66.65 billion yuan, accounting for 36.7% of the total issuance amount. Second, road construction, a total of 54.4 billion yuan was issued in 32 issues, accounting for 24.1% of the total number of issues and 30% of the total amount issued. The urban park construction and comprehensive projects have issued 23 and 22 issues respectively, with the issuance amount of 25.87 billion yuan and 28.68 billion yuan respectively (see Table 9).

Table 9: Distribution on Use of Issuance of City Bond

(Before 31.12.2009)

Use of Funds	Number of Issuance	Amount (Yuan Billion)	Proportion of Number of Issuance	Proportion of Amount
Water Conservancy and Environment Management	51	66.65	38.30%	36.70%
Road Construction	32	54.4	24.10%	30%
Urban Park Construction	23	25.87	17.30%	14.20%
Genenral Prohects	22	26.68	16.50%	15.80%
Others	5	5.95	3.80%	3.30%

Source: National Bureau of Statistics of China 2009, author

C. Source of Debt Repayment Funds

As the character of urban investment companies undertaking public construction determines that their profitability is limited, it is difficult for them to maintain continuous operation solely on their own operating revenue, let alone having surplus funds to repay debts due. Therefore, the local government must provide various policies such as implicit guarantee, development license and tax preference for city investment companies. On the other hand, local governments must also provide substantial financial support in the form of financial subsidies. In this way, the debt repayment funds of these city investment companies are largely derived from the fiscal revenue of local governments.

For further analysis, the city bonds are more similar to the revenue bonds, rather than general obligation bonds, which can be seen clearly in the issuance process, the use of funds, the repayment of funds and the credit rating. From the perspective of issuing procedures, the issuance procedures of urban city bonds and revenue bonds are relatively simple, without the special approval of special local authorities (local people's congresses), but only need the local administrative organs to set up a city investment company that meets the conditions for issuing corporate bonds. From the perspective of fund use, the funds raised by city bonds and municipal bonds are basically used for roads and bridges, public transportation and public utilities, which can generate part of the income to a certain extent, so they can rely on the cash flow generated by these projects to repay capital and interest to a certain extent. Although this part of income is limited, so the repayment of bond principal and interest mainly depends on the local government through special fund subsidies, but if these city investment companies operate and manage well, it can reduce the local government's subsidy pressure on city investment companies to a large extent. It is also because local governments indirectly or implicitly guarantee city investment companies and city bonds that the main body and bond level of urban investment companies are similar to yield bonds, which is not very high compared with general obligation bonds.

4.2.1.2 Development of the City Bonds

From the number and amount of corporate bonds issued in each year from 2002 to 2009, before 2009, corporate bonds of city investment companies developed rapidly, but the growth rate was relatively stable, and basically maintained a relatively fast growth rate. However, in 2009, the corporate bonds of city investment corporation (city bonds) developed the most, making 2009 a crucial year for the development of city bonds. In 2009, a total of 108 issues of corporate bonds of city investment corporation were issued with an issue amount of 153 billion yuan, which was 1.45 times of the total issue amount from 2002 to 2008 and 1.51 times of the total issue amount, mainly due to the expansionary fiscal policy and loose monetary policy adopted by China in response to the economic crisis (see Table 10). In November 2008, the central government issued a 4 trillion yuan economic stimulus plan, in which the central government invested 1.18 trillion yuan and the rest came from local supporting and private funds.

Table 10:Amount of City Bonds Issued by City Investment Corporation and Corporate Bonds (inyuan billion)

Year	Number of Issuance	Amount of City Bonds Issued by City Investment Corporation (Yuan Billion)	Amount of Corporate Bonds (Yuan Billion)	Proportion of Corporate Bonds
2002	2	3	31.5	9.50%
2003	4	8.3	44	18.90%
2004	2	3.4	35.1	9.70%
2005	9	11	67.4	16.30%
2006	13	16.2	107.5	15.10%
2007	23	23.3	170.9	13.60%
2008	21	36.3	238.2	15.40%
2009	108	153	425	36%
Total	182	254.4	1120	22.70%

Source: National Bureau of Statistics of China 2009, author

From the perspective of single issuing amount, all the city investment corporations issued more than 300 million yuan, the vast majority of the city bonds issuance for 700 million to 1 billion yuan, the second is 1 billion to 1.5 billion yuan, the single also has 42 period is higher than 1.5 billion yuan, and issuance in 300 million to 500 million yuan less, only seven. This is mainly due to the fact that most corporate bonds of city investment companies are invested in urban infrastructure projects, which are characterized by long investment term and large investment capital (see Table 11).

Table 11: Distribution on Single Issuance of City Bonds

Single Amount of Issuance (Yuan Billion)	Number of Issuance	Amount (Yuan Issuance)	Proportion of Number of Issuance	Proportion of Amount
0.3-0.5	7	3.5	3.80%	1.40%
0.5-0.7	13	8.1	7.10%	3.20%
0.7-1	68	63.9	37.40%	25.10%
1-1.5	52	73.1	28.60%	28.70%
>1.5	42	105.8	23.10%	41.60%

Source: National Bureau of Statistics of China 2009, author

From the perspective of bond maturity, it is mainly medium and long term, of which 7 years and 10 years account for the majority, which is also determined by the use of funds. To be specific, a total of 70 issues were issued in the 7-year period, accounting for 38.5% of the total number of issues. The issue amount was 96.62 billion yuan, accounting for 38% of the total issue amount. A total of 59 issues were issued in the 10-year period, accounting for 32.4% of the total number of issues. The issuance amount was 89.3 billion yuan, accounting for 35.1% of the total issuance amount. Bonds with maturities of 3, 8 and more than 20 years were the fewest, with only two maturities each. The 5-year and 6-year maturities are both 16 issues (see Table 12).

Table 12: Distribution on Maturity of City Bonds

Bond Maturity (Year)	Number of Issuance	Amount (Yuan Billion)	Proportion on Number of Issuance	Proportion of Amount
3	2	3.7	1.10%	1.50%
5	16	23.5	8.80%	9.20%
6	16	15.8	8.80%	6.20%
7	70	96.7	38.50%	38%
8	2	2	1.10%	0.80%
10	59	89.3	32.40%	35.10%
15	15	21	8.20%	8.30%
20	2	2.5	1.10%	1%

Source: National Bureau of Statistics of China 2009, author

4.2.2 Local Government Bonds

In order to achieve the goal of stable economic growth in China, China implemented a proactive fiscal policy in 2009 and substantially increased the government's public investment through the issuance of Treasury bonds. China has decided to launch an initial public offering of local government bonds in April in a bid to motivate all parties and ease the financial burden on the central government, which is the “municipal bonds” in China.

In 2018, 4165.2 billion yuan of local government bonds were issued nationwide. Of this, 2,219.2 billion yuan was issued in general bonds and 1946 billion yuan in special bonds. By purpose, 2,170.5 billion yuan of new bonds were issued, accounting for 99.6 percent of the new debt limit, and 1994.7 billion yuan of replacement bonds and refinancing bonds were issued. In 2018, local government bonds will be issued with an average maturity of 6.1 years, including 6.1 years for general bonds and 6.1 years for special bonds. The average interest rate issued was 3.89%, including 3.89% for general bonds and 3.9% for special bonds.

In 2017, 4358.1 billion yuan of local government bonds were issued nationwide. Among them, 2361.9 billion yuan of general bonds and 1996.2 billion yuan of special bonds; By purpose, a total of 1,589.8 billion yuan of new bonds and 2,768.3 billion yuan of replacement bonds were issued (Ministry of finance of People's Republic of China, 2018).

From the specific bonds varieties, special debt there are land reserve project income, government toll road, rail transportation and Penggai four varieties of bonds, which is given priority to with land reserve special bonds, toll road special bonds and rail transit special bond issuance on a smaller scale, the future of our country will actively explore the field of public welfare undertakings in a certain income classification issuing special bonds, mature one issue.

4.3 Comparison Between U.S. Municipal Bonds Market and China's Municipal Bonds Market

Since China issues different kinds of "municipal bonds" in a different time, we compare the municipal bonds market between two countries separately.

4.3.1 Comparison between U.S Municipal Bonds Market and China's City Bonds

A. Market Size

From the perspective of market size, although China's city bonds have gone through nearly 20 years of development, the overall scale is small, and there is still a big gap compared with the municipal bonds of the United States. For example, at the end of 2009, the total volume of urban investment bonds in China was 382.49 billion yuan, compared with 2.81 trillion U.S. dollars in the same period. From the development of municipal bonds in the United States, which an important part of the bond market. The development of municipal bonds cannot be separated from the development of the entire bond market. Municipal bonds can only grow if the overall bond market grows. From this point of view, there is still a big gap between China's city bonds and municipal bonds of developed countries, and it is urgent to continuously promote the development of the corporate bond market.

B. Maturity of Issuance

From the perspective of issuance maturity, the maturity of municipal bonds in the United States is mainly medium and long term, and the proportion of long-term bonds in municipal bonds reached 86.6% in 2009. In this regard, the issuance maturity of China's city bonds is basically similar to that of the United States. In addition to medium-term notes and short-term financing notes, city investment corporation bonds are mostly medium and long term, mainly 7 and 10 years. But relatively speaking, the proportion of bonds over 10 years is less than 45%, while the proportion of bonds under 7 years is nearly 20%. The term structure still needs to be further adjusted, especially the proportion of bonds over 10 years should be further increased.

C. Tax Incentives

In the United States, since municipal bonds are public debt, they give tax breaks to both issuers and investors. The interest income individuals earn on municipal bonds is exempt from federal income taxes, and local governments, as issuers, have no tax problem. It can be said that tax incentives are an important motivation for the development of municipal bonds in the United States. City bonds in China can belong to the category of corporate bonds. Both city investment companies as issuers and the public as investors need to pay taxes on their relevant income. As an independent economic legal entity, city investment company needs to pay income tax on the income from its investment using the proceeds from bond issuance. Although bond interest can offset the income tax of city investment companies, the income after the tax credit is still subject to income tax, which makes city investment bonds in China lose an important advantage over other ordinary corporate bonds and discourses the enthusiasm of city investment companies to some extent. As an investor, the interest income from investment in city bonds is subject to interest income tax, which is no different from that of ordinary corporate bonds. This also makes city bonds lose their appeal to investors in terms of tax revenue and restricts the development of city investment bonds in China to a certain extent.

D. Using of Issuance

From the perspective of capital use, the capital use direction of city investment bonds in China and municipal bonds in developed countries is basically the same, mainly used in quasi-public products such as roads and bridges, public transportation and public utilities, and rarely used in other aspects. This is mainly determined by the properties of urban investment bonds and municipal bonds.

E. Capital Repayment Sources

From the perspective of capital repayment sources, municipal bonds in developed countries mainly rely on tax for repayment. If they are income bonds, they can be repaid through the proceeds of investment projects. The city bonds issued by China are issued in the name of city investment corporation, which, as an economic-legal person, can only rely on the cash flow of the enterprise in both name and principle. However, as city investment companies mainly invest in public goods, they have to rely on local government subsidies to repay the principal and interest of bonds, because the income generated by their projects is limited or even negative. Therefore, the development of urban investment bonds cannot be separated from the financial support of the government. From this point of view, city bonds and developed countries are relatively close to the yield bond.

F. Issuing Environment

Municipal bonds in the United State have been developed for a long time with standardized operating mechanism and mature operating environment. By contrast, the development of China's capital market only started after the Reform and Opening Up, with a history of only 30 years, while the development of city bonds is even shorter, with a history of less than 20 years. As a result, China's financial market, especially the capital market, as a whole is relatively backward, and various supporting measures for the operation of the capital market are insufficient to standardize its operation. Various laws and regulations are relatively deficient, and many areas of legislation are even blank; The variety of financial products is relatively single, and the financial instruments available for investors are also limited, resulting in a relatively single investor. All these make the overall risk of the capital market relatively high, which further restricts the healthy and rapid development of corporate bonds and city bonds.

4.3.2 Comparison Between U.S. Municipal Bonds and China's Local Government Bonds

A. Market Size

From the view of the market size, the U.S. municipal bonds market has a larger market size than China, because of its longtime development and a more complete system. For instance, in 2018, the U.S.issued $7424.0 billion of bonds, including $338.3 billion of municipal bonds. While In 2018, 4165.2 billion yuan of local government bonds were issued, which has a quite difference between the United States.

B. Maturity and Way of Using

In the United States, municipal bonds are mainly issued in the form of agreement underwriting, including fixed interest rate, variable interest rate, and zero coupons. Issuance term diversification, but mainly in the 15-20 - year - long - term bonds. In China, local government bonds are issued in the form of underwriting and tendering, with fixed interest payment in the form of bookkeeping. Among them, there are 5 types of general bonds (including 1 year, 3 years, 5 years, 7 years and 10 years) with fixed issuance terms, and the issuance scale of bonds with a single term shall not exceed 30% of the annual issuance scale of general bonds. ; Special bonds have six fixed issuance maturities, two years more than ordinary bonds, and require that the combined issuance size of 7 - and 10-year bonds should not exceed 50% of the annual issuance size of special bonds.

C. Issuing Entity and Type of Bonds

The U.S. municipal bonds are dominated by general obligation bonds and revenue bonds. Since the United States is a federal country, municipal bonds issued by local governments have their own independence autonomy, without the approval or consent of the federal government. However, the issuance of general liability bonds needs to have a strict budget approval process and sometimes requires a national referendum.

The types of local government bonds in China are similar to those in the United States, including general bonds and special bonds. The main issuers are the province, autonomous region, municipality directly under the central government (the city-county government raises the debt by the provincial government to act for

Issue). At present, local debts are subject to limited management in China, and the national debt limit of local governments is confirmed, the determination process mainly involves the state council, the ministry of finance, the National People's Congress, the provincial financial departments, the provinces, the NPC standing committee, and provincial governments. Local government debt was capped at 18.8 trillion yuan in 2017.

D. Regulation System

The issuance and transaction of municipal bonds in the United States are restricted by both the federal law and the state law. A municipal bond regulatory system focusing on information disclosure and anti-fraud regulation, with the first-line supervision of market self-regulatory agencies as the main body and the supervision of government regulatory agencies as the auxiliary body, has been established. The U.S. municipal bond information disclosure process is complete and detailed, and MSRB's municipal bond electronic information platform provides investors with timely, regular and free municipal bond secondary market interest.

The ministry of finance and the local finance bureau are mainly responsible for the supervision of local government bonds in China. In September 2014, the state council issued the opinions on strengthening the management of local government debt (document no. 43), which started the reform thinking of local government debt in China. The government began to actively build a standardized local government debt financing mechanism and established a management system of quota management, budget management, risk management, and daily supervision. Local bonds are mainly disclosed through local government portal websites, China bond information network and official websites of exchanges.

Credit Rating

In the United State, Standard & Poor's, Moody's and Fitch all evaluate the credit status of local governments from the key economic, fiscal and debt factors. The rating results of different states are quite different. Thanks to the perfect market supervision system, the objectivity, authenticity, and accuracy of rating agencies' results can be guaranteed.

China requires local government bond issuers to sign credit rating agreements with credit rating agencies, accept credit ratings and issue rating reports in a timely manner. Local debt rating agencies mainly include New Century, Dagong International and China debt credit. The local debt rating framework of domestic rating agencies draws lessons from the experience of the three major international rating agencies and determines the credit rating mainly from the adequacy and stability of debt repayment funds. The ratings are determined by how much support the central government gives to local governments, and the difference in economic indicators is not enough to change the overall level of risk. Given China's political system, local government bankruptcies don't happen in China. As a result, more than 95 percent of China's local debt is now in debt are all rated AAA (Ministry of finance of People's Republic of China, 2018).

E. Structure of Investors

Thanks to tax incentives, the largest investor in us municipal bonds are the individuals. In addition, mutual funds are the second largest holders of us municipal bonds, but in fact, the main investors behind the funds are also individuals, which further increases the proportion of individual holdings of us municipal bonds. China's local government bonds are mainly invested by Banks and other financial institutions (see Table 13).

Table 13: Comparison Between U.S. Municipal Bonds and China's Local Government Bonds

	China's Local Government Bonds	**U.S. Municipal Bonds**
Issuer	Local governments	Local governments and their political entities
Way of Issuing	Underwriting and bidding	Underwriting agreement
Amount Management	Quota management: the national local government debt limit determination process mainly involves the state council, the ministry of finance, the National People's Congress, the provincial financial departments, the standing committees of the provincial people's congresses and the provincial governments.	The issuance of general obligation bonds is subject to a strict budgetary approval process and sometimes a national referendum.
Type of Bonds	General bonds and special bonds	General obligation bonds and revenue bonds
Type of Intrest Rate	Fixed rate	Fixed rate, variable rate and zero coupon
Structure of Maturity	There are 5 types of general bonds (including 1 year, 3 years, 5 years, 7 years and 10 years) with fixed issuance terms, and the issuance size of bonds with a single term shall not exceed 30% of the annual issuance size of general bonds. ; Special bonds have six fixed issuance maturities, two years more than ordinary bonds, and require that the combined issuance size of 7 - and 10-year bonds should not exceed 50% of the annual issuance size of special bonds.	Issuance term diversification, but mainly in the 15-20 - year - long - term bonds
Rating Method	To determine the credit rating from the liquidity and stability	Issuer's overall debt level and structure, fiscal revenue status, budget management level and regional economic development status
Rating Institution	New century, Dagong International, China debt credit, etc	S&P, Moody's, Fitch
Regulation System	The ministry of finance and the local finance bureau are responsible for the establishment of a management system of quota management, budget management, risk management and daily supervision.	The municipal bond supervision system focuses on information disclosure and anti-fraud, and is mainly supervised by market self-regulatory agencies and supplemented by government regulatory agencies
Information Disclosure	Local government portal, China bond information network, exchange official website	EMMA
Structure of Investor	Banks and other financial institutions	Individual investors

Source: SIFMA 2018, National Bureau of Statistics of China 2009, author

4.4 Inspiration and Suggestions for China’s Local Government Bonds

In recent years, China has continuously expanded the replacement scale of local government debt stock, standardized local government financing channels, and gradually established a local government debt financing mode focusing on issuing local government bonds. At the same time, the state attaches great importance to the risk of local government debt and strictly guards against regional and systemic financial risks. In general, China's local government debt is trying to develop in the direction of marketization. However, as the legal environment and infrastructure construction are still in the initial stage, China should establish and gradually optimize the issuance, supervision, and risk prevention system of local government bonds as soon as possible on the basis of learning from the mature operation and management experience of developed countries.

A. Expand the issuing market

First, China can expand the maturity setting for local government bonds. At present, the term of general bonds of local governments in China includes 1 year, 3 years, 5 years, 7 years and 10 years. The term setting of special bonds includes 1 year, 2 years, 3 years, 5 years, 7 years and 10 years. Because municipal bonds are mostly used to support municipal construction and infrastructure construction, and the investment cycle is long, there is an obvious maturity mismatch between local government bonds and projects in China, which can learn from the experience of municipal bonds in the United States, and further, try to issue bonds with a maturity of 10 years or even 30 years, so as to make the bond repayment period more matching with the whole life cycle of the project.

Second, China can set reasonable targets for controlling the size of bond issuance. In accordance with the principle of matching financial powers and responsibilities, reasonable division of the local government financial resources, based on local resources, and debt paying ability, science selected debt indicators (such as financial debt servicing ratio or indebtedness) and determine the index limit, and within the upper limit of indicators according to the relative stability of the "debt ratio" approved the issuance of local government, namely, the more the more advanced the economy solvency, the greater the issuance of approval.

B. Improve the supervision system

First, give full play to the role of self-regulatory organizations. The United States mainly relies on self-regulatory organizations such as MSRB and FINRA to implement self-regulatory management of the industry by formulating self-regulatory rules and conducting routine enforcement inspections. In the process of developing municipal bonds in China, the unique advantages of self-regulatory organizations should be given full play, and the association of inter-bank market dealers, exchanges and other self-regulatory institutions can be considered to play a greater role in the formulation and implementation of municipal bond industry standards, information disclosure and supervision, punishment for illegal transactions and other aspects.

Second, we should establish a strict and standardized information disclosure system. From the experience of the United States, the establishment of a strict and standardized information disclosure system is conducive to enhancing the risk control ability of local governments and improving the risk identification ability of investors, so as to promote the healthy and rapid development of local government bond market. Therefore, it is suggested that China further establish and improve the local debt information disclosure system, make specific provisions on the content, principles, and responsibilities of false information disclosure of local debt information, and improve the timeliness, consistency, and integrity of information disclosure.

C. Risk prevention

First, China should improve the credit rating system for local government bonds. At present, China's local debt issuance management measures have clearly required local debt credit rating, which is conducive to the disclosure of local debt risk and information disclosure. However, there are still some problems in the actual operation, and the local government credit rating system needs to be further improved. First of all, the order supervision of local debt credit rating industry should be strengthened to avoid the impartiality and impartiality of rating results caused by vicious competition. Secondly, the double rating mechanism for local government bonds should be gradually established and promoted, and the rating results should be given by two independent rating agencies (especially those with different fee models), so as to provide more objective and reliable reference for investors. Thirdly, rating agencies should improve the technical level of rating personnel and strengthen the professional talent reserve.

Second, improve the external credit mechanism. External credit enhancement mechanism can improve the credit rating of bonds and save financing costs for issuers. In addition, it can effectively spread risks, reduce the market impact of a bond default, and enhance bond liquidity. Therefore, it is suggested that China should establish a sound external credit enhancement mechanism, such as learning from the U.S. municipal bond insurance experience, introducing local government bond insurance, establishing an open and transparent market-oriented bond insurance mechanism, and cultivating professional bond insurance institutions.

5 Conclusion

According toan analysis of the municipal bond market of the United States and China, we can find out a quite difference between these two countries.

The United States has a long history of developing municipal bonds,municipal bonds in the United States are mainly divided into general obligation bonds and income bonds, and are issued by local governments and their political entities.In the United States, local governments encourage residents to hold municipal bonds through tax incentives. Therefore, the main investors of municipal bonds in the United States are individual investors. Because most buyers of municipal bonds choose to hold them to maturity, the secondary market for us municipal bonds is relatively inactive.

When it comes to China, there are two kinds of bonds which are very similar to the municipal bonds. The first ones are the city bonds. The most difference between the U.S. municipal bonds is that the issuers of the city bonds are the city investment companies, while these companies are controlled by the local government. Another kind of bonds are the local government bonds, which are almost the same as the U.S. municipal bonds.

Finally, by comparing Chinese local government bonds with U.S. municipal government bonds, this thesis suggests that China should establish and gradually optimize the issuance,supervision, and risk prevention system of local government bonds based on the mature operation and management experience of developed countries, which can be operated by the following means: First, China should expand the maturity setting for local government bonds, for example, trying to issuing bonds with a maturity of 10 years or even more; Second, China should set reasonable targets for controlling the size of bond issuance, for example, setting an upper limit of indicators according to the relative stability. Third, China should give full play to the role of self-regulatory organizations. Fourth, the government should establish a strict and standardized information disclosure system. Fifth, we will improve the credit rating system for local government bonds. Sixth, improve the external credit mechanism.For example, to make specific provisions on the content, principals, and responsibilities of information disclosure.

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List of abbreviations

NYSE, New York Stock Exchange.

LSE, London Stock Exchange.

JSE, JSE Limited (previously the JSE Securities Exchange and the Johannesburg Stock Exchange).

BSE，Bombay Stock Exchange.

NASDAQ，The Nasdaq Stock Market.

OTC, Over the Counter.

GO, General Obligation Bonds.

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Ostrava dated 30/04/2019

Jie Li

Jie Li

List of Annexes

Annex 1: Budget law of the People's Republic of China promulgated by order no. 21 of the President of the People's Republic of China in 1994

Annex 2: Municipal Bonds Trading in Different Sectors

Annexes

Annex 1: Budget law of the People's Republic of China promulgated by order no. 21 of the President of the People's Republic of China in 1994

Chapter 3 budget compilation

24 governments at various levels, departments and units shall prepare draft budgets within the time limit prescribed by the state council.

25 the central budget and the budgets of local governments at various levels shall be compiled with reference to the implementation of the previous year's budget and the forecast of revenues and expenditures for the current year.

26 the central budget and the budgets of local governments at various levels shall be formulated in accordance with the double budgets.

The measures for the compilation and implementation of double budgets shall be formulated by the state council.

27 the public budget of the central government is not included in the deficit.

Part of the funds necessary for construction investment in the central budget may be raised through such means as borrowing domestic and foreign debts, but such borrowing shall be of a reasonable size and structure.

The central budget shall, in accordance with the provisions of the preceding paragraph, provide the funds needed for the repayment of principal and interest on the debts already borrowed.

28 the budgets of local governments at various levels shall be compiled in accordance with the principle of living within their means and balancing their revenues and expenditures, and shall not include deficits.

Except as otherwise provided by law and the state council, local governments shall not issue local government bonds.

29 the budget revenues at various levels shall be compiled in line with the growth rate of the gross national product.

Income that must be included in the budget according to regulations shall not be concealed or underreported, nor shall the abnormal income of the previous year be taken as the basis for the compilation of budgetary income.

30 the principles of practicing strict economy and building the country through diligence and thrift shall be implemented in the compilation of budgetary expenditures at various levels.

Budgetary expenditures at various levels shall be compiled in an overall way to ensure priority areas and properly arrange other types of budgetary expenditures on the premise of ensuring the reasonable needs of government public expenditures.

31 the central budget and the budgets of the local governments concerned shall allocate necessary funds to assist the economically underdeveloped national autonomous areas, old revolutionary base areas and outlying and poverty-stricken areas in developing economic and cultural undertakings.

32 in the budgets of governments at various levels, reserve funds shall be set up at the rate of 1 to 3 percent of the amount budgeted for by the governments at the corresponding levels to be used for the expenditures on disaster relief for natural disasters and other unforeseeable special expenditures in the implementation of the budgets of the current year.

33 budgetary circulating funds shall be established in the budgets of governments at various levels in accordance with the provisions of the state council.

34 the surplus of the budgets of governments at various levels in the previous year may be used in the next year for the expenditure of items carried forward in the previous year. Where there is a balance, it may supplement the working capital of the budget; Any remaining sum may be used for necessary budgetary expenditures in the next year.

35 the state council shall give timely instructions on the preparation of the draft budget for the next year.

The specific matters concerning the preparation of the draft budget shall be arranged by the financial department under the state council.

36 the governments of provinces, autonomous regions and municipalities directly under the central government shall, within the time limit prescribed by the state council, submit draft general budgets at the corresponding levels to the state council for examination, verification and summary.

37 the financial department of the state council shall, one month before the annual session of the National People's Congress, submit the main contents of the draft central budget to the finance and economic committee of the National People's Congress for preliminary examination.

Provinces, autonomous regions and municipalities directly under the central government, city divided into districts, autonomous prefecture government financial departments shall be held in the people's congresses at the corresponding levels are meeting a month ago, will be the main content of the draft budgets at the corresponding level submitted to the people's congresses at the corresponding levels the relevant special committee, or according to the standing committee of the people's congresses at the corresponding levels, director of the decision of the meeting submitted to the standing committee of the people's congresses at the corresponding levels on the working committee of preliminary examination.

The financial departments of the governments of counties, autonomous counties, cities not divided into districts or municipal districts shall, one month before the session of the people's congresses at the corresponding levels, submit the main contents of the draft budgets at the corresponding levels to the standing committees of the people's congresses at the corresponding levels for preliminary examination.

Annex 2: Municipal Bonds Trading in Different Sectors

Date	Par Amount ($ Millions)	Total	Education	Health	Utility	Various Purpose	Housing	Industrial Development Revenue	Transportation	Tax-Revenue	Other
Jan-07	$533,096	100%	23%	12%	12%	7%	8%		8%		25%
Feb-07	$457,969	100%	25%	11%	14%	7%	7%		8%	5%	23%
Mar-07	$528,345	100%	22%	11%	13%	6%	8%		7%		26%
Apr-07	$540,717	100%	22%	14%	13%	6%	7%		7%		27%
May-07	$587,853	98%	23%	12%	14%	6%	8%		7%	4%	24%
Jun-07	$647,657	100%	22%	11%	13%	8%	9%		8%		24%
Jul-07	$540,598	99%	21%	13%	11%	5%	9%		8%	9%	23%
Aug-07	$634,198	100%	22%	13%	11%	7%	10%		8%	6%	23%
Sep-07	$447,480	101%	22%	13%	12%	7%	7%		9%	5%	26%
Oct-07	$492,172	100%	20%	14%	11%	7%	8%		9%		24%
Nov-07	$492,463	100%	20%	13%	11%	6%	11%		10%	4%	25%
Dec-07	$434,317	100%	24%	15%	10%	6%	7%		8%		26%
Jan-08	$530,931	99%	24%	14%	10%	6%	7%		9%		25%
Feb-08	$593,285	100%	19%	17%	13%	6%	5%		10%	5%	25%
Mar-08	$529,488	101%	16%	15%	12%	7%	7%		13%	6%	25%
Apr-08	$500,171	99%	17%	16%	10%	7%	8%		8%		27%
May-08	$360,565	101%	18%	16%	12%	7%	8%		9%	5%	26%
Jun-08	$409,925	100%	16%	14%	11%	8%	8%		9%	5%	29%
Jul-08	$342,391	100%	16%	14%	11%	8%	6%		10%		29%
Aug-08	$289,300	99%	17%	14%	11%	8%	8%		9%		28%
Sep-08	$436,007	100%	16%	16%	12%	8%	7%		8%		29%
Oct-08	$394,519	100%	18%	14%	11%	8%	5%		10%	4%	30%
Nov-08	$233,745	101%	19%	16%	10%	7%	6%		11%	5%	27%
Dec-08	$280,169	101%	18%	15%	12%	9%	5%		10%	5%	27%
Jan-09	$242,623	100%	21%	10%	12%	8%	6%		10%	6%	27%
Feb-09	$220,900	100%	21%	12%	12%	9%	5%		11%	5%	25%
Mar-09	$240,720	100%	18%	13%	11%	11%	5%		9%	5%	28%
Apr-09	$264,657	101%	18%	14%	12%	12%	4%		10%		26%
May-09	$239,249	100%	17%	14%	13%	8%	5%		9%	5%	29%
Jun-09	$287,793	99%	18%	12%	12%	8%	4%		8%	10%	27%
Jul-09	$262,109	101%	18%	13%	12%	8%	5%		9%	7%	29%
Aug-09	$254,679	100%	17%	12%	12%	7%	5%		11%	6%	30%
Sep-09	$313,845	100%	16%	10%	12%	8%			9%	5%	32%
Oct-09	$283,812	99%	16%	11%	13%	10%	4%		9%	7%	29%
Nov-09	$248,031	100%	16%	14%	12%	8%		5%	9%	5%	31%
Dec-09	$283,202	101%	15%	13%	11%	8%		5%	8%	6%	35%
Jan-10	$267,044	100%	17%	11%	13%	8%	5%		10%	6%	30%
Feb-10	$246,410	101%	16%	14%	12%	10%	4%		9%	6%	30%
Mar-10	$320,196	100%	15%	12%	12%	11%		4%	8%	7%	31%
Apr-10	$292,619	99%	16%	13%	14%	8%			8%	6%	30%
May-10	$282,664	100%	17%	13%	14%	8%		4%	8%	6%	30%
Jun-10	$292,145	100%	19%	12%	11%	7%			8%	6%	33%
Jul-10	$262,887	100%	16%	12%	10%	9%		5%	10%	6%	32%
Aug-10	$276,409	100%	17%	11%	9%	8%		5%	9%	7%	34%
Sep-10	$267,613	101%	18%	12%	10%	9%		5%	9%	6%	32%
Oct-10	$266,002	98%	15%	11%	11%	9%			9%	8%	31%
Nov-10	$295,276	99%	16%	9%	11%	9%			9%	6%	32%
Dec-10	$287,562	99%	17%	10%	13%	8%		6%	10%	7%	28%

Date	Par Amount ($ Millions)	Total	Education	Health	Utility	Various Purpose	Housing	Industrial Development Revenue	Transport ation	Tax-Revenue	Other
Jan-11	$251,787	99%	17%	11%	12%	10%		7%	8%	7%	27%
Feb-11	$232,021	99%	16%	10%	11%	10%			8%	8%	26%
Mar-11	$245,623	99%	17%	11%	12%	10%		7%	9%	7%	26%
Apr-11	$240,773	99%	15%	11%	11%	9%		7%	9%	7%	30%
May-11	$223,988	99%	18%	10%	11%	9%		6%	9%	6%	30%
Jun-11	$248,459	98%	18%	9%	12%	9%		5%	9%	6%	30%
Jul-11	$227,309	100%	18%	11%	10%	9%	6%		9%	7%	30%
Aug-11	$275,517	100%	17%	10%	12%	8%	6%		8%	8%	31%
Sep-11	$240,471	99%	16%	9%	12%	9%			7%	8%	30%
Oct-11	$223,210	101%	14%	12%	11%	11%		7%	8%	9%	29%
Nov-11	$230,548	98%	16%	10%	11%	9%		8%	10%	8%	26%
Dec-11	$205,671	100%	16%	9%	11%	9%			10%	9%	30%
Jan-12	$223,471	101%	19%	11%	13%	11%			7%	11%	24%
Feb-12	$225,095	100%	18%	12%	12%	10%		8%	8%	7%	25%
Mar-12	$232,046	100%	19%	10%	12%	12%		7%		7%	26%
Apr-12	$233,633	101%	16%	14%	13%	11%		7%	7%	8%	25%
May-12	$245,519	100%	18%	11%	11%	11%		7%	7%	9%	26%
Jun-12	$261,547	100%	16%	12%	11%	8%		8%	7%	9%	29%
Jul-12	$239,545	100%	16%	11%	13%	10%		7%	7%	11%	25%
Aug-12	$255,964	100%	17%	11%	11%	9%		8%		8%	27%
Sep-12	$203,342	99%	17%	11%	12%	10%		8%	9%	8%	24%
Oct-12	$244,930	100%	15%	12%	12%	10%		8%	8%	9%	26%
Nov-12	$244,148	100%	17%	11%	13%	11%		6%	8%	9%	25%
Dec-12	$228,535	100%	16%	12%	12%	10%		9%	10%	8%	23%
Jan-13	$240,860	100%	17%	12%	11%	8%		9%	11%	7%	25%
Feb-13	$199,493	99%	20%	11%	12%	9%		8%	8%	7%	24%
Mar-13	$222,304	99%	18%	11%	11%	10%		8%	8%	8%	25%
Apr-13	$273,881	99%	17%	12%	12%	10%		7%	8%	7%	26%
May-13	$229,604	101%	19%	12%	12%	8%		8%	7%	8%	27%
Jun-13	$261,659	102%	17%	10%	13%	9%		8%	9%	9%	27%
Jul-13	$235,420	101%	18%	11%	12%	10%		7%	13%	8%	22%
Aug-13	$264,650	100%	15%	11%	13%	9%			9%	8%	26%
Sep-13	$244,187	99%	16%	12%	12%	9%		6%	9%	13%	22%
Oct-13	$240,438	98%	15%	12%	12%	11%		7%	8%	11%	22%
Nov-13	$194,924	99%	18%	11%	12%	10%		8%	8%	8%	24%
Dec-13	$208,397	100%	18%	10%	13%	9%		7%	11%	9%	23%
Jan-14	$215,275	100%	19%	10%	12%	10%		6%	11%	11%	21%
Feb-14	$179,801	101%	19%	10%	12%	10%		7%	9%	11%	23%
Mar-14	$229,150	100%	15%	9%	13%	14%		7%	9%	10%	23%
Apr-14	$229,441	99%	18%	11%	12%	9%		8%	8%	9%	24%
May-14	$209,960	99%	19%	9%	13%	10%		7%	10%	9%	22%
Jun-14	$215,708	101%	18%	10%	13%	11%		7%	8%	10%	24%
Jul-14	$224,395	99%	17%	9%	14%	11%		7%	8%	12%	21%
Aug-14	$190,577	101%	20%	9%	12%	12%		6%	9%	10%	23%
Sep-14	$190,126	101%	17%	10%	13%	11%		8%	8%	11%	23%
Oct-14	$240,539	99%	17%	9%	12%	14%		8%	9%	10%	20%
Nov-14	$171,521	100%	18%	11%	13%	12%		8%	9%	8%	21%
Dec-14	$191,238	100%	19%	10%	13%	11%		6%	11%	9%	21%
Jan-15	$183,159	100%	20%	8%	13%	12%		4%	10%	10%	23%
Feb-15	$175,577	100%	21%	8%	15%	12%			9%	10%	21%
Mar-15	$206,074	99%	22%	7%	13%	14%		5%	7%	10%	21%
Apr-15	$238,996	99%	19%	10%	15%	10%		6%	8%	8%	23%
May-15	$217,544	99%	20%	9%	14%	12%		6%	7%	8%	23%
Jun-15	$226,688	99%	20%	9%	11%	12%		5%	7%	9%	26%
Jul-15	$177,297	98%	20%	7%	12%	12%			8%	10%	24%
Aug-15	$156,581	99%	20%	7%	11%	14%			8%	13%	22%
Sep-15	$151,000	100%	19%	9%	11%	13%			10%	12%	22%
Oct-15	$165,794	100%	18%	7%	12%	13%			13%	13%	20%
Nov-15	$134,075	100%	19%	7%	13%	13%			11%	13%	20%
Dec-15	$139,291	100%	21%	5%	12%	12%	5%		11%	12%	22%

Date	Par Amount ($ Millions)	Total	Education	Health	Utility	Various Purpose	Housing	Industrial Development Revenue	Transport ation	Tax-Revenue	Other
Jan-16	$153,400	99%	23%	8%	12%	13%			9%	11%	19%
Feb-16	$162,477	100%	22%	8%	13%	13%			8%	10%	21%
Mar-16	$241,376	100%	22%	10%	12%	14%	6%		6%	8%	22%
Apr-16	$221,040	99%	22%	9%	12%	11%		5%	7%	8%	25%
May-16	$229,992	100%	19%	11%	13%	10%		6%	11%	7%	23%
Jun-16	$269,321	100%	19%	11%	11%	12%			8%	7%	26%
Jul-16	$202,325	100%	18%	12%	13%	11%		6%	9%	9%	22%
Aug-16	$276,825	100%	19%	12%	13%	10%		7%	7%	9%	23%
Sep-16	$268,557	101%	16%	13%	12%	9%	8%		8%	10%	25%
Oct-16	$247,368	101%	18%	13%	14%	10%		6%	9%	8%	23%
Nov-16	$229,830	99%	17%	14%	14%	10%		4%	9%	10%	21%
Dec-16	$288,262	99%	18%	12%	13%	11%		6%	9%	9%	21%
Jan-17	$228,149	100%	22%	11%	11%	12%		6%	10%	9%	19%
Feb-17	$204,926	100%	21%	10%	10%	12%		6%	10%	9%	22%
Mar-17	$256,632	100%	19%	10%	11%	13%			8%	8%	24%
Apr-17	$202,594	101%	19%	13%	13%	10%		5%	8%	9%	24%
May-17	$234,848	100%	21%	12%	11%	9%		6%	6%	11%	24%
Jun-17	$227,895	99%	19%	9%	11%	11%	8%		7%	10%	24%
Jul-17	$190,644	99%	18%	9%	10%	12%	7%		9%	10%	24%
Aug-17	$217,776	100%	18%	10%	10%	11%		6%	10%	9%	26%
Sep-17	$179,437	100%	19%	10%	12%	11%		6%	8%	8%	26%
Oct-17	$219,265	100%	16%	10%	11%	13%		5%	9%	10%	26%
Nov-17	$224,949	101%	18%	10%	10%	13%		5%	9%	10%	26%
Dec-17	$311,044	100%	17%	14%	12%	10%		6%	8%	8%	25%
Jan-18	$248,662	100%	17%	13%	12%	10%		7%	8%	9%	24%
Feb-18	$203,487	100%	19%	10%	12%	11%			8%	10%	24%
Mar-18	$240,125	100%	17%	11%	11%	13%		5%	8%	10%	25%
Apr-18	$258,373	100%	16%	11%	12%	11%		7%	8%	9%	26%
May-18	$245,777	99%	19%	10%	12%	12%		6%	8%	9%	23%
Jun-18	$262,232	100%	16%	9%	12%	10%		7%	7%	9%	30%
Jul-18	$226,216	99%	16%	9%	11%	9%		8%	8%	9%	29%
Aug-18	$275,599	101%	15%	11%	11%	10%		6%	9%	9%	30%
Sep-18	$217,224	100%	15%	10%	12%	9%		7%	9%	9%	29%
Oct-18	$287,896	101%	14%	11%	11%	10%		6%	11%	10%	28%
Nov-18	$240,634	100%	16%	12%	11%	10%		6%	9%	9%	27%
Dec-18	$221,362	100%	17%	12%	10%	10%		7%	9%	9%	26%
Jan-19	$248,841	101%	18%	9%	11%	12%		6%	10%	10%	25%
Feb-19	$239,034	99%	17%	10%	10%	11%		6%	8%	12%	25%
Mar-19	$237,966	100%	20%	8%	9%	14%		6%	7%	12%	24%